Modeling and Simulation of Aviation Environmental Impact

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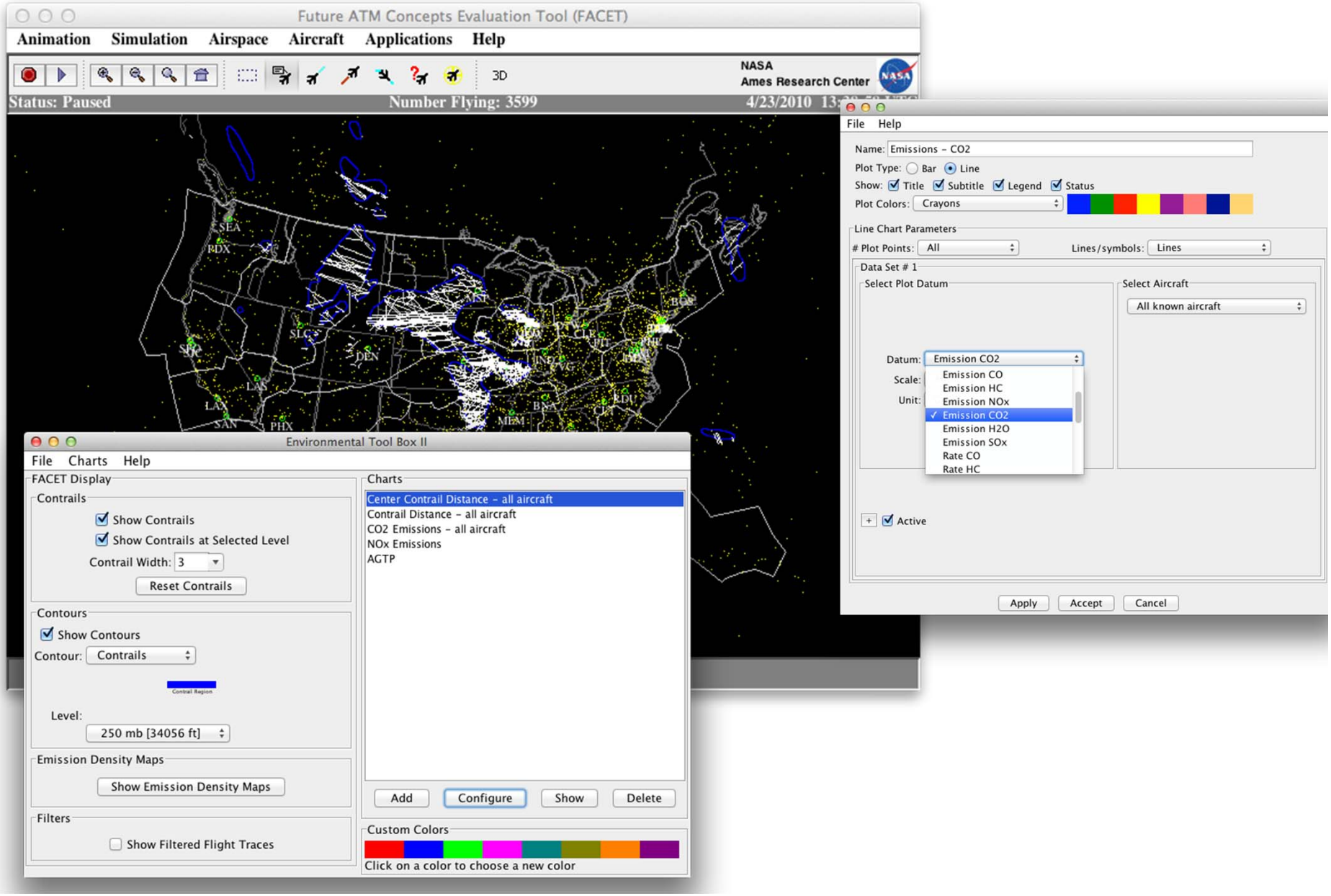
Objectives

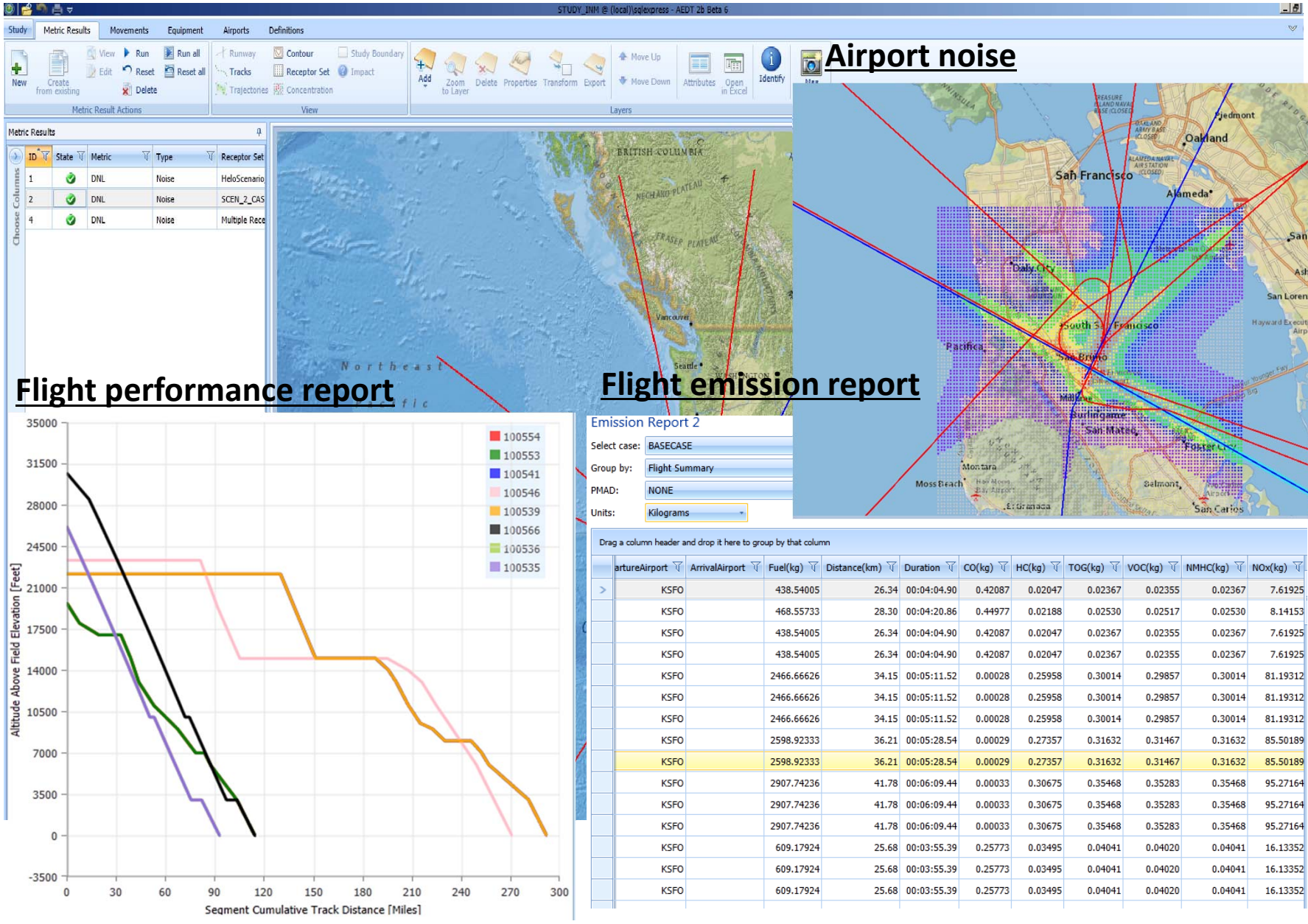
- Develop simulation methods and software to assess environmental / climate / economic impacts of various aviation activities

- Integrate NASA's flight simulation software with FAA's Aviation Environment Design Tool (AEDT)

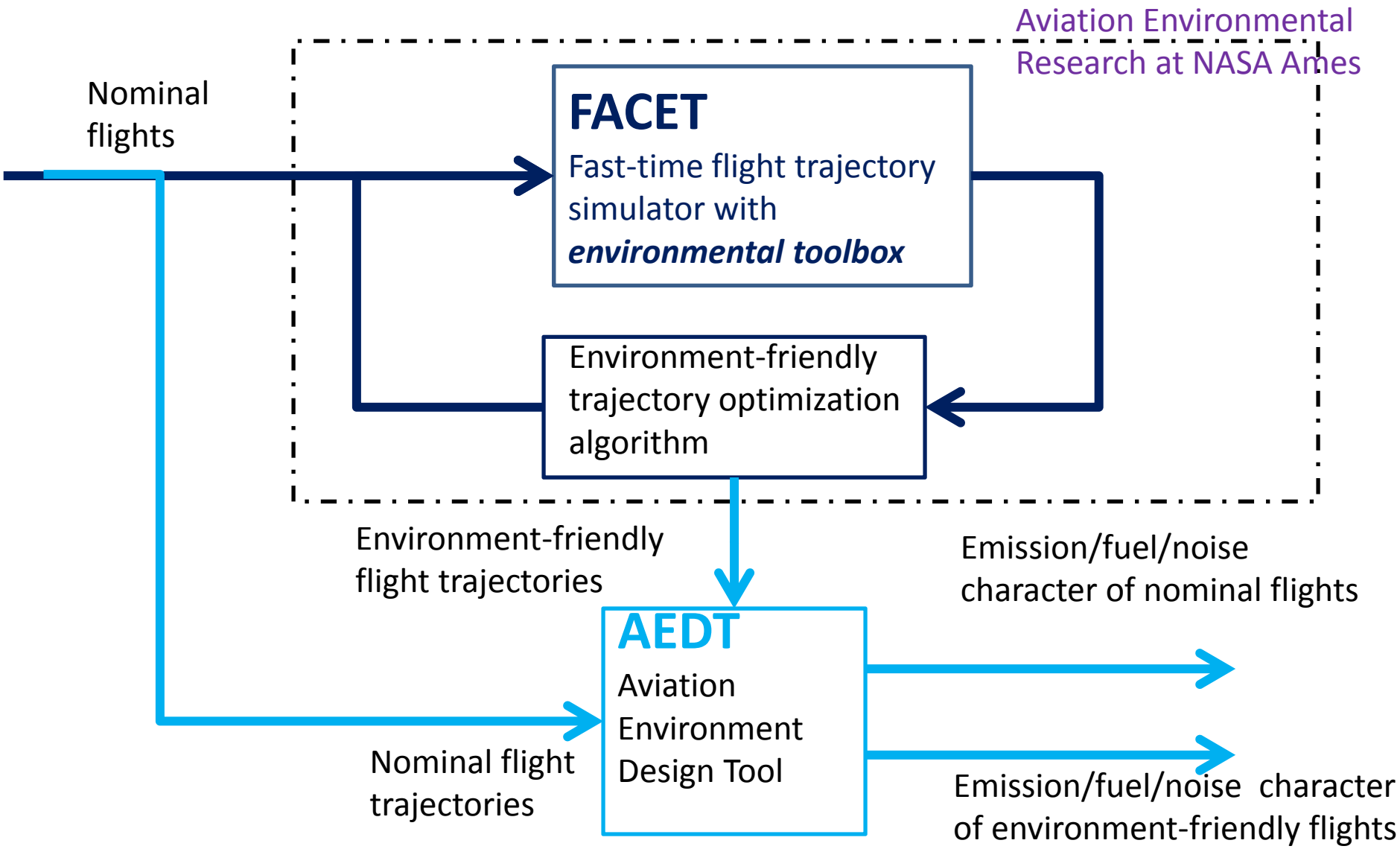
FACET Environmental Toolbox



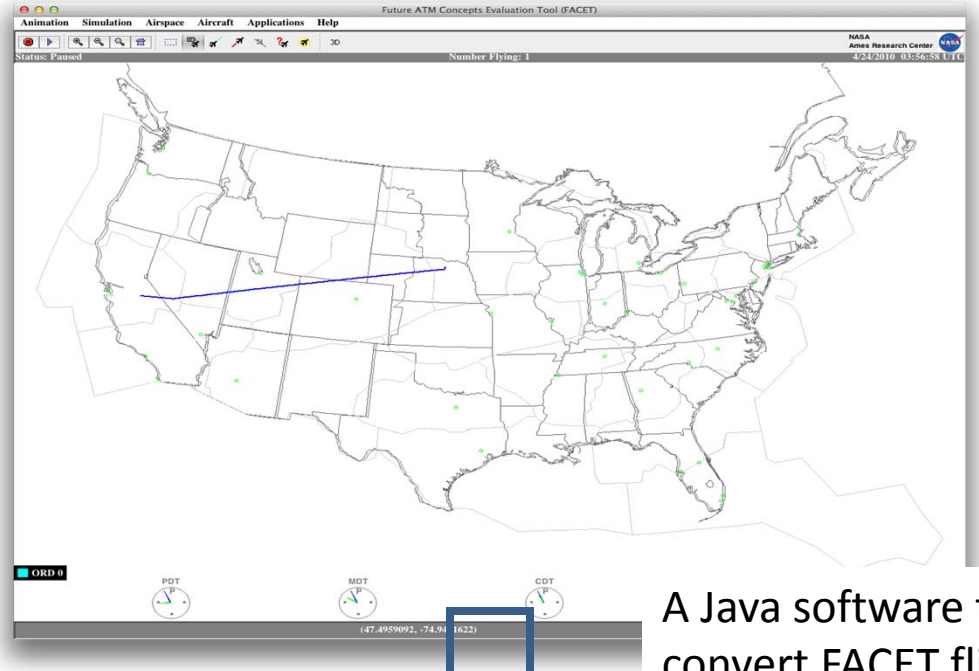
Aviation Environment Design Tool



FACET and AEDT Integration

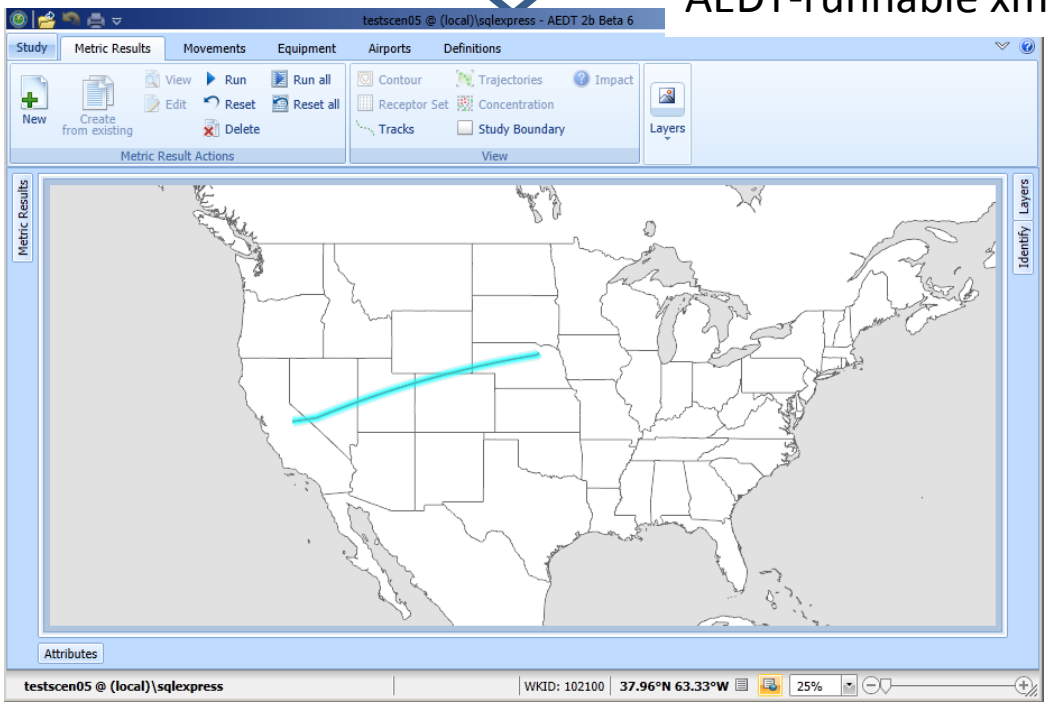


FACET User Interface



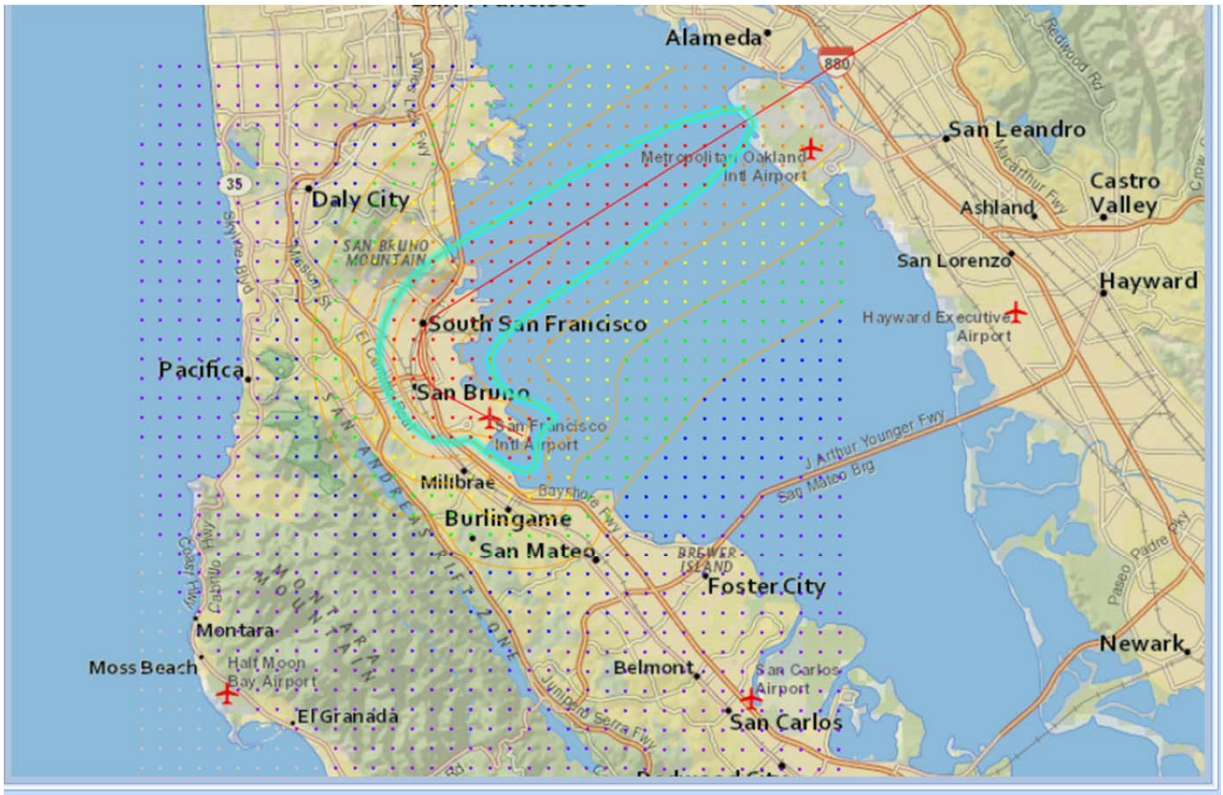
A Java software tool developed to convert FACET flight track file into AEDT-runnable xml file

AEDT User Interface



Noise - AEDT

A Boeing 757 single-op departure sound exposure (SEL) at SFO



Attributes

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4	60	48289.8074203013	30.006	False			Exposure	SEL
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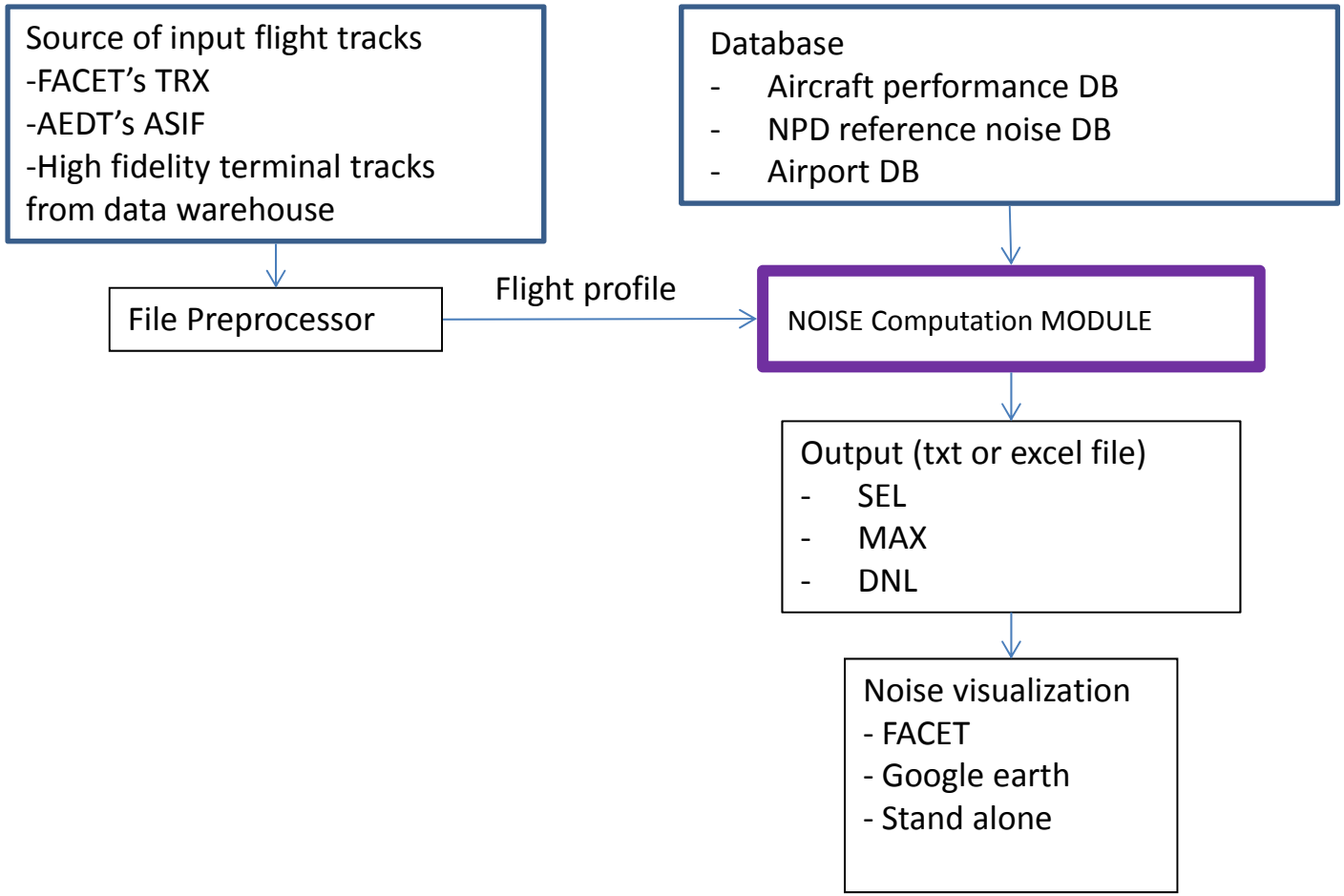
On-going development

Build a computationally efficient noise model



Noise Computation Module

Start

Model
-**fixed wing**
-helicopter

Noise level metrics
-**exposure based**
-**maximum**

Segment geometry and physical parameters

Fixed wing noise level interpolation L(p,d)

Exposure-based metric?

Yes

Noise fraction adjustment

Noise duration adjustment

No

Lateral attenuation

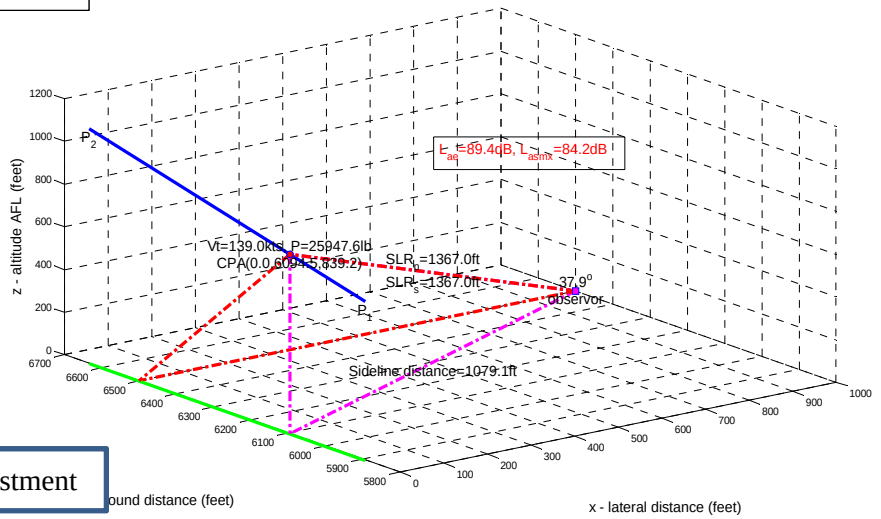
Behind takeoff ground roll?

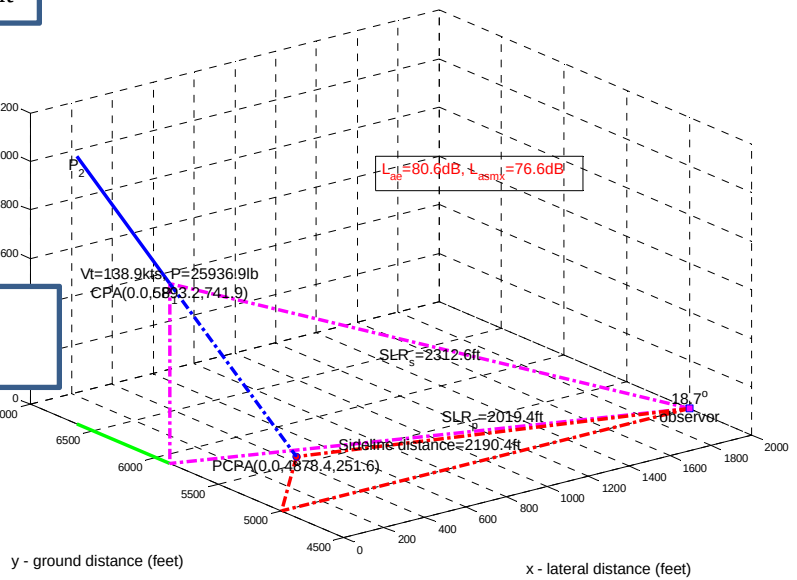
Yes

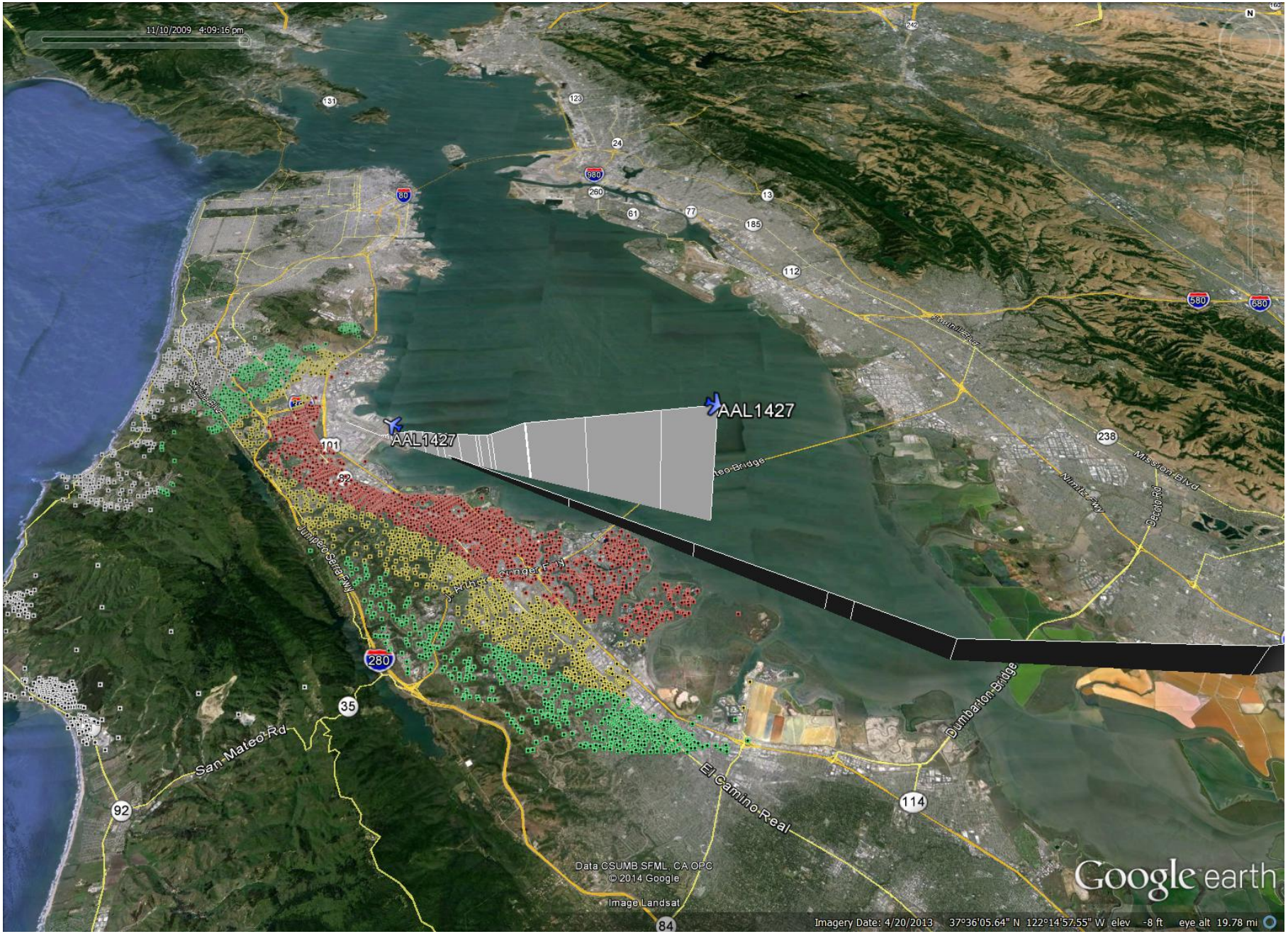
Ground directivity adjustment

Metric computation

Next segment



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Dumbarton Bridge
Mission Blvd
Nimitz Fwy
Junipero Serra Fwy
Data CSUMB SFML, CA OPC
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Google earth
Imagery Date: 4/20/2013 37°36'05.64" N 122°14'57.55" W elev -8 ft eye alt 19.78 mi

Conclusions

- Developed computationally-efficient fuel/emission/noise models and validated the models with AEDT
- Continue to work on computational-efficient Aircraft/Airport noise model